some years resided at Brompton. He then did occasional Sunday duty at various churches, and ultimately Dr. Kynaston, the Rector of St. Nicholas Cole Abbey, gave him the Rectory House (afterwards demolished in making Queen Victoria Street) on condition that he would look after the parish generally. Thus for some years he lived in the very heart of the City of London. Another civic appointment he obtained in the shape of the Evening Lectureship at St. Clement's, Eastcheap. This dies with him. From his youth he took a keen and abiding interest in geology, and joined the staff of King's College as Lecturer in Geology in 1872. In 1881 he was appointed Assistant Professor, and was Professor from 1890 to 1897. He sat for many years on the Council of the Geological Society, of which until quite recently he was Treasurer. He was for many years, too, Honorary Secretary to the Palæontographical and Ray Societies, the members of which united in 1890 in presenting him with his portrait and a testimonial. This portrait now hangs in the "Wiltshire" collection of fossils in the Woodwardian Museum at Cambridge, to which he was a benefactor, having presented his old University with his splendid collection of fossils, and founded a "Wiltshire" prize for proficiency in geology and mineralogy. In recognition of this the honorary degree of D.Sc. was conferred on him on April 27, 1899. He was a member of the Clothworkers' Company, and at one time Master, an office held by Samuel Pepys in the reign of Charles the Second, and by Lord Kelvin quite recently. In this connection he also founded prizes in the Company's Grammar School at Sutton Valence, in Kent. He was also on the Executive Committee of the City and Guilds of London Institute, and on the Council of the Yorkshire College, King's College, &c., and was a member of the Athenæum Club. His interest in astronomy was purely in its mathematical aspect, as at no time was he ever a practical observer. It is some years since he attended any of our meetings. On the night of the 26th of October last he went up to London from his residence at Blackheath, and preached his usual sermon as evening lecturer at St. Clement's, Eastcheap, returning apparently in perfect health, but early the next morning died in his sleep, without a struggle, from heart failure. He was elected a Fellow of this Society on the 9th of March 1860.

Marie Alfred Cornu was born on the 6th of March 1841 at Châteauneuf, near Orleans.

He was sent to the Lycée at Orleans, and in 1860 entered the École Polytechnique, and two years later the École des Mines. He finished his course here in 1866, and the next year, at the age of 26, he was chosen as Professor of Physics at the École Polytechnique.

His earliest researches, communicated to the Académie des Sciences in 1863–65, were on "The Reflection of Light at Metallic Surfaces" and kindred subjects. Soon after this he

commenced his researches on "The Velocity of Light," and devised various improvements on Fizeau's method, which he tested by observations between the École Polytechnique and Mont Valérien, stations about $6\frac{1}{2}$ miles apart. The desirability of a redetermination of the velocity of light with all attainable accuracy was brought into prominence by its relation to the solar parallax, which was then occupying the thoughts of astronomers in connection with the approaching transits of *Venus*. Early in 1874, at the suggestion of Le Verrier and Fizeau, the Council of the Observatory of Paris asked Cornu to make this redetermination.

He chose the terrace of the Observatory as one station, and erected on it a telescope of 15 inches aperture and 30 feet focus to transmit a beam of light to a mirror mounted on the tower of Montlhéry, about 14 miles distant, which reflected the light back to him. The toothed wheel by which he measured the time of transmission to Montlhéry and back was capable of 1600 revolutions per minute, and he was able with this apparatus to obtain a movement of as many as twenty-one teeth of the wheel during the passage and repassage of the beam of light. As a mean of many experiments he found for the velocity of light *in vacuo* 186,700 miles per second, which it may be interesting to note gives, in combination with the value $20''{\cdot}52$ for the constant of aberration, a value of $8''{\cdot}77$ for the solar parallax. An interesting account of Cornu's method and results is given in *Nature*, 4th of February 1875.

In conjunction with M. Baille, Cornu, between 1870 and 1880, made several determinations of the mean density of the Earth. They used the method of the torsion balance designed by Michell, and first employed by Cavendish, commencing their work by careful subsidiary studies of the torsion balance. Their apparatus, which was set up in a cellar of the École Polytechnique, differed from that used by their predecessors in several particulars, especially in the employment of much smaller attracting masses, and in the use of hollow spheres filled with mercury, which could be pumped from a sphere on one side to another on the other side, thus avoiding the disturbance caused by the movement of heavy solid masses. In July and August 1872 they obtained the result 5·56, and later in the year 5·50, the former result being considered the better. In 1878 they again obtained the result 5·56, and, as showing the stability of the apparatus, they state that the time of swing of the balance did not vary from 408 seconds by more than one or two tenths for over a year. The most recent value—that found by Mr. C. V. Boys in 1894 by the employment of quartz fibres—is 5·527.

It is only possible to give a brief summary of Cornu's many important spectroscopic researches. In 1878 and 1879 he contributed papers to the Académie des Sciences and to the Royal Society, dealing with the effect of atmospheric absorption on the ultra-violet end of the spectrum. He showed that, from this

cause, it was impossible to obtain the solar spectrum beyond a definite limit, which he fixed at λ 2930. He also gave a formula for the limit as dependent on the altitude of the Sun and the elevation of the observer above sea-level, and proved that the absorption was caused by the oxygen and nitrogen of the atmosphere and not by the aqueous vapour or dust. He confirmed his formula experimentally by showing that a triple line of aluminium at λ 1860 was extinguished by four metres of air.

About the year 1886 Cornu made a series of observations and measures of wave-length of the atmospheric and solar lines which occur in the bands called a, B and A by Ångström and near D. His method of discriminating between solar and telluric lines consisted in throwing on the slit of his spectroscope an image of the two limbs of the Sun in rapid succession. The solar lines are thus displaced alternately to the violet and red, owing to the Sun's rotation, while the atmospheric lines remain stationary.

In 1886, the year after Balmer gave his well-known formula for the wave-lengths of the hydrogen lines, Cornu made careful determinations of their wave-lengths, the ultra-violet hydrogen lines up to that time being only known in the stellar spectra of Huggins and Vogel. In 1885 he concluded, from observations of the spectra of aluminium and thallium, that in metallic spectra there are series of lines which obey a law like that of the hydrogen lines, and that the lines which thus fall into series are the lines which most readily admit of reversal. The later work of Kayser and Runge in the determination of series is well known.

Cornu published maps of the ultra-violet part of the solar spectrum in continuation of Ångström's work. These are extremely accurate, but are not accompanied by tables, and at the present time Rowland's tables are more generally useful. He also investigated the ultra-violet part of many metallic spectra.

When *Nova Cygni* was discovered in 1876 Cornu was the first to investigate its spectrum. As he used a somewhat high dispersion he obtained the emission spectrum only. He measured the wave-lengths of eight bright lines, six of which he identified as C, D_3, *b*, F, Hγ, and the corona line.

On the occasion of the transit of *Venus* in 1874 and later, at the request of the Council of the Observatory of Paris, he considered in what way object glasses made for visual observation could be used photographically. Reverting to an idea of Sir John Herschel's, he showed that the separation of the lenses by a distance rarely more than $1\frac{1}{2}$ per cent. of the focal distance transformed an achromatism adapted for visual rays to one adapted for the photographic rays. He applied his method to obtain photographs of the Moon with the large object glass of the Paris Observatory, and obtained excellent results. It is of interest to note that he profited by the transparency of the

collodion film to guide on a point on the surface of the Moon, and by guiding on it to allow for the motion of the Moon.

When the photographic chart of the sky was begun Cornu was one of the delegates appointed by the Académie des Sciences, and he was an active member of the various astrographic congresses.

The memoirs which Cornu contributed to the Académie des Sciences are models of clear exposition. His lectures and addresses were equally marked for their lucidity and admirable style. In England he lectured on several occasions at the Royal Institution, and in 1899 he gave the Rede lecture at Cambridge on the wave theory of light.

The importance of his scientific work was appreciated both in France and in foreign countries. In 1878 he received the Lacaze prize of the Académie des Sciences and the Rumford Medal of the Royal Society. In 1896 he was President of the Académie des Sciences. In 1886 he was appointed to the Bureau des Longitudes. In England he was elected a foreign member of the Royal Society in 1884 ; the degree of Hon. Sc. D. was conferred on him at Cambridge in 1899. He was elected an Associate of the Royal Astronomical Society in 1890.

M. Cornu continued to discharge his duties at the École Polytechnique, and was engaged in his usual scientific work till Easter. He left Paris soon afterwards, apparently in the best of health, to spend a short vacation at Orleans. He died on the 12th of April, after a very short illness.

M. Cornu had many friends in England as well as in France, who will feel that his death is a personal no less than a scientific loss.

Hervé Faye was born on the 1st of October 1814. He entered the École Polytechnique in 1832, and in 1836 became an assistant at the Paris Observatory. In 1844 he received the Lalande Prize of the Academy for his discovery of a comet and his subsequent researches on it. In 1847 he became a Member of the Institute, and was shortly afterwards appointed lecturer on Geodesy at the École Polytechnique. In 1854 he became Rector of the Academy and Professor of Astronomy at Nancy. In 1862 he succeeded Biot at the Bureau des Longitudes. In 1870 he was chosen as Inspector-General of Secondary Scientific Education, and in 1874 returned to the École Polytechnique as Professor of Astronomy and Geodesy. He was for a time Minister of Public Instruction.

From 1878–1888 he was Inspector-General of Higher Education.

Faye's discovery of the comet which bears his name was made on the 22nd of November 1843, and communicated to the Academy of Sciences. It was followed on the 6th of December by a communication of the elements of the parabolic orbit obtained from observations made on the 24th and 29th of